STATE OF ALASKA

Jay S. Hammond, Governor

Annual Performance Report for

INVENTORY AND CATALOGING OF SPORT FISH AND SPORT FISH WATERS OF THE LOWER SUSITNA RIVER AND CENTRAL COOK INLET DRAINAGES

by

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Job No. G-I-H
Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Lower Susitna River and Central Cook Inlet Drainages

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RESEARCH PROJECT SEGMENT

State:	ALASKA	Name:	Sport Fish Investigations of Alaska
Project No.:	F-9-10		
Study No.:	G-I	Study Title:	INVENTORY AND CATALOGING
Job No.:	G-I-H	Job Title:	Inventory and Cataloging of Sport Fish and Sport Fish Waters of the Lower Susitna River and Central Cook Inlet Drainages.

Period Covered: July 1, 1977 to June 30, 1978.

ABSTRACT

Rainbow trout, Salmo gairdneri Richardson, were experimentally stocked in 14 Anchorage area lakes and coho salmon, Oncorhynchus kisutch (Walbaum), planted in two lakes.

The 1977 escapement of chinook salmon, O. tshawytscha (Walbaum), in west side Susitna streams was studied. All surveyed streams revealed that escapements in 1977 were substantially higher than in any previous year.

A creel census program designed to determine harvest of, and effort for, eulachon, Thaleichthys pacificus (Richardson), of the Twenty Mile River dip net sport fishery was conducted. An estimated 170,349 eulachon were harvested, providing approximately 6,791 man-days of recreation.

Creel census activities conducted at Eshamy Creek in Prince William Sound revealed a total recreational harvest of 114 sockeye salmon, O. nerka (Walbaum), in 233 man-days of fishing effort.

Creel census data obtained from the Deshka River disclosed that anglers fished an estimated 10,904 man-hours to harvest 527 coho salmon, a seasonal rate of success of 0.05 fish per hour.

Movements of rearing coho salmon and chinook salmon were studied in two tributaries of the Susitna River, Montana and Rabideux creeks. Marked coho salmon exhibited no distinct directional movements in Rabideux Creek. Chinook fry densities remained relatively constant in Montana Creek until late February, when a very distinct decline was noted. However, marked rearing chinook exhibited a gradual downstream movement throughout the season while no upstream movement was recorded.

BACKGROUND

Concern over the decline of recreational harvest levels of coho salmon in upper Cook Inlet streams necessitated a creel census program on the Deshka River, a popular sport fishing area, to obtain angling effort and harvest data. Periodic creel checks have been conducted in the past but have provided a less than accurate estimate of total catch. In 1977 the fishery was more closely monitored.

The magnitude of the chinook salmon run into upper Cook Inlet cannot be evaluated because of the many turbid, glacial streams in which the salmon cannot be detected visually. Enumeration of salmon in the Susitna River drainage is confined to the clear water tributaries. Since 1964 chinook salmon escapement surveys have been made annually on selected streams in the Susitna basin.

During 1977 a creel census program was conducted at Eshamy Creek in western Prince William Sound to establish sport fish effort and harvest levels. Recreational access to Eshamy Lake and Lagoon is primarily by small boats, originating from Whittier, and float planes. Present recreational use is light, but is expected to increase significantly as facilities at Whittier and Valdez develop.

As in previous years, the program for restocking Anchorage area lakes was continued in 1977. Test netting to determine population trends within managed lakes was also conducted.

During 1977 a creel census program was conducted at Twenty Mile River to establish sport fish effort and harvest levels for eulachon. This is a short (April 23-June 6, 1977) and intense fishery near Anchorage. The purpose of the creel census was to assess the importance of the fishery and maintain a continuing data base.

A program designed to determine the rearing habitat and intra-stream movements of chinook and coho fry and yearlings was initiated in 1977. This program was accomplished by intensive trapping and marking of these salmonids from mid-June through the end of February. Two tributaries to the Susitna River, located near Talkeetna, were utilized for this study.

RECOMMENDATIONS

1. Investigation of spawning runs of eulachon, their biological characteristics, and the sport fishery in the Turnagain Arm area should be continued.

2. A creel census should be conducted on the Deshka River and Alexander and Lake creeks to obtain angling effort and estimates of the total chinook harvest.

3. Investigation of waters between the Chakachatna River on Cook Inlet and the headwaters of the Talachulitna River should be conducted on a continuing basis due to anticipated effects of proposed coal and gas field development in the area.

4. Emphasis of the coho program should be directed to obtaining sport fish effort and harvest data from selected west side Cook Inlet drainages. Other methods of obtaining data related to spawning and early life history of this species in selected watersheds should be investigated.

5. Chinook salmon escapement counts should be continued on west side upper Cook Inlet streams.

6. Experimental stocking evaluations on Anchorage area lakes should be continued.

OBJECTIVES

1. Determine the environmental characteristics of the existing and potential recreational fishing waters of the job area, and where practical, obtain estimates of the sport fish harvest and angler participation rates.

2. To evaluate the impact of water use and urban development projects on fisheries, aquatic life, and water quality of lakes and streams in the area.

3. To determine stocking measures, formulate management practices and direct the course of future studies on area waters.

4. To investigate, evaluate, and develop plans for the enhancement of salmon stocks.

TECHNIQUES USED

Fish population sampling throughout the Anchorage-western Susitna River area was accomplished with 125 ft. variable mesh gill nets, a Smith-Root Type V backpack electrofishing unit, minnow traps, hook and line, and dip nets. Measurements on fish collected included total lengths to the nearest millimeter (mm), and weight to the nearest gram (g). Scale samples from fish were pressed on cellulose acetate sheets and projected on the screen of a micro-Design C.O.M. 200 scale reader to determine age.

Escapement surveys were conducted from July 11 through August 12. Streams were low and clear, thus affording excellent viewing conditions. Most of the major stream systems were surveyed at least twice to determine the peak period of abundance. Two basic methods, aerial and ground surveys, are utilized to obtain distribution, numbers and time of arrival of

chinook salmon in upper Cook Inlet streams. All surveys on the west side Susitna River were done by helicopter. Other counting methods have included counting towers, weirs, and sonar salmon counters. However, since it is not economically feasible to have a weir or tower on each stream, aerial and ground methods will continue as the only source of information on most streams of the area.

A statistically selected sample of anglers was interviewed and counted to determine harvest of and effort for eulachon in the Twenty Mile River dip net fishery. For the period April 23-June 6, the day was stratified into two seven-hour periods (8 a.m. - 3 p.m. and 3 p.m. - 10 p.m.). The week was stratified into a weekday division and a weekend-holiday division. Each week two of the seven-hour periods were randomly chosen from each of the week divisions. During these randomly chosen periods, counts of anglers were made hourly, and all anglers who had completed their fishing trip were interviewed. Angler effort hours for the season was estimated by multiplying the mean hourly count for each stratum by the number of hours in the fishing season for that stratum and summing over all strata. Harvest was estimated by multiplying catch per hour (from interviews) by estimated effort for each stratum and summing over all strata.

The Deshka River coho salmon creel census program was designed to obtain effort and harvest data. The period July 22-August 31 was stratified by week, weekday, and weekend-holiday. Aerial counts were conducted at times randomly chosen from the hours 8 a.m., 9 a.m. and 10 p.m. One count was made on every Saturday, Sunday, and holiday and on two randomly selected weekdays each week. Interviews of anglers who had finished fishing for the day were conducted throughout the period 8 a.m. to 10 p.m. on weekends and holidays and during three randomly selected weekdays from 8 a.m. to 3 p.m. or 3 p.m. to 10 p.m. each week.

Total angler hours was estimated by multiplying mean strata angler counts by total potential strata fishing hours and summing over these strata. Total angler-days was estimated by dividing estimated angler hours by the mean hours fished per angler (this mean calculated from interview data) for each stratum and summing over strata. Similarly, harvest was estimated by multiplying catch per hour from interviews by total estimated angler hours for each stratum and summing over strata.

A creel census was also conducted at Eshamy Creek to determine angler utilization. This census was designed to contact 100% of the anglers for total sport harvest and effort information.

Two clearwater tributaries of the Susitna River were selected for study in the Talkeetna area, Rabideux and Montana creeks. Each tributary was divided into three sub-areas which corresponded to the upper, middle, and lower areas of the systems. Each sub-area was intensively fished with salmon roe baited minnow traps from mid-June until mid-November.

Coho salmon yearlings in Rabideux Creek were anesthetized with MS-222, then fin clipped to identify area of capture; i.e., upper caudal lobe for upper sub-area, one-half dorsal for mid sub-area, and lower caudal lobe

for lower sub-area. After marking, the salmon were allowed to recover and were released at the location of capture. The marking in Rabideux Creek was conducted from June 16 through August 31. Recovery of these marked cohos was conducted periodically until November 15. After that time, the creek was heavily iced and sampling was terminated.

Montana Creek was seined continuously in the upper and middle sub-areas from July 19 until August 4. During this period, a total of 25,176 chinook salmon fry were marked with upper and lower caudal clips, which designated their area of capture. After this time, minnow traps were fished to monitor fry movements and population densities throughout the system.

Water chemistry was monitored in both drainages, with a Hock Field Test Kit. Water temperature was recorded with the use of Ryan 30-day recording thermographs.

Access to study areas in Rabideux Creek was achieved through the use of a canoe, while Montana Creek was accessible by foot.

Water flows were measured in Rabideux Creek by recording the height of the water passing through culverts at the Parks Highway approximately one-half mile above its confluence with the Susitna River. These recordings were then converted into cubic feet per second.

FINDINGS

Results

Sport Fish Stocking:

Seventeen lakes and one stream in the Anchorage management area were experimentally stocked with game fish in 1977. The location of each lake, date stocked, species, size and number of fish released are shown in Table 1.

Test Netting:

The 11 lakes in the Anchorage area test netted in 1977 are shown in Table 2 with fish species present and size composition of fish caught. All of the lakes shown are included in the Sport Fish Division's experimental stocking program.

Most of the lakes were test netted twice, the first time in October, to determine survival of planted fish prior to freeze-up and again during the month of May after the ice had gone off to determine winter survival. In general, survival of stocked fish in these managed lakes appeared to be normal after a summer's fishing season; however, test netting results during May produced no fish in Triangle, Fish, Hillberg, and Gwen lakes. These four lakes are small, ranging from 7 to 27 hectares (3 to 11 acres) in size and are relatively shallow, thus contributing to low oxygen levels. Overwintering of fish in these lakes has been poor in the past, and it appears stocking fish of less than catchable size is impractical.

Table 1. Experimental Fish Stocking in Anchorage Area Lakes, 1977.

Lake	Location	Date	Species Stocked	Number Stocked	Size Fish/lb.
Beach	Birchwood	6-15	RT	5,017	3.3
Campbell Pt.	Anchorage	5-24	RT	1,697	4.3
	Anchorage	6- 7	RT	24	Adults
	Anchorage	6- 7	RT	10	Adults
	Anchorage	6- 7	RT	3	Adults
	Anchorage	7-22	RT	5,219	21.3
	Anchorage	7-22	RT	4,621	20.6
Cheny Pond	Anchorage	7-11	SS	50,000	Fry
C St. Gravel Pit	Anchorage	7-11	SS	50,000	Fry
Jewell	Anchorage	5-24	RT	1,494	4.3
	Anchorage	6- 7	RT	9	Adults
	Anchorage	6- 7	RT	4	Adults
	Anchorage	6- 7	RT	31	Adults
	Anchorage	7-22	RT	11,736	21.3
	Anchorage	11-18	RT	200	Adults
	Anchorage	11-18	RT	500	Adults
Lower Fire	Anchorage	5-24	RT	1,101	4.0
	Anchorage	7-22	RT	11,000	20.6
	Anchorage	11-21	RT	226	3.7
	Anchorage	11-21	RT	2,278	4.0
Mirror	Chugiak	6-18	GR	100,000	Fry
	Chugiak	6-20	GR	100,000	Fry
	Chugiak	6-21	GR	29,000	Fry
Sand	Anchorage	5-24	RT	1,204	4.0
Fish	Elmendorf	6-15	RT	1,002	3.3
Green	Elmendorf	5-23	RT	1,247	4.4
Hillberg	Elmendorf	5-23	RT	1,384	4.2
	Elmendorf	6- 7	RT	10	Adults
	Elmendorf	6- 7	RT	1	Adults
	Elmendorf	11-18	RT	500	Adults
Six Mile	Elmendorf	6-17	SS	10,800	Fry
	Elmendorf	7-11	SS	40,800	Fry
Triangle	Elmendorf	5-23	RT	813	4.4
Clunie	Ft. Richardson	5-23	RT	1,418	4.4
	Ft. Richardson	6-28	RT	2,345	2.2
Gwen	Ft. Richardson	5-23	RT	1,032	4.2
	Ft. Richardson	6- 7	RT	12	Adults
	Ft. Richardson	6-28	RT	968	2.2
Otter	Ft. Richardson	5-23	RT	1,247	4.4
	Ft. Richardson	6- 7	RT	12	Adults
	Ft. Richardson	6-28	RT	3,484	2.2
	Ft. Richardson	11-17	RT	200	Adults
Thompson	Ft. Richardson	5-24	RT	1,204	4.0
Williwaw Creek	Portage	6-19	GR	100,000	Fry
Total stocked	RT - 63,253 SS - 151,600 GR - 329,000				

* RT - rainbow trout
SS - coho salmon
GR - grayling

Table 2. Test Netting Results, Anchorage Area Lakes, 1977.

Lake	Date	Species*	No. of Fish	Length (mm) Range	Mean
Mirror	5-18	GR	30	230-285	252
	10-12	GR	14	233-289	257
Cheny	10-12	SS	15	115-323	203
		DV	1	371	371
Hillberg	5-14	--	0	-	-
	10- 4	RT	1	338	338
Green	5-17	RT	7	280-385	342
	10- 4	RT	2	288-300	294
Triangle	5-17	--	0	-	-
	10- 4	RT	2	238	238
Fish	5-17	--	0	-	-
	10- 4	--	0	-	-
Six Mile (Upper)	5-19	--	0	-	-
	10- 4	SS	30	90-125	117
Six Mile (Lower)	5-18	SS	15	110-140	127
	10- 5	SS	2	138-263	201
	10-18	SS	2	125	125
		RT	9	255-425	337
	10-19	SS	1	109	109
		RT	1	222	222
Gwen	5-24	--	0	-	-
	10-18	RT	30	254-635	**
Clunie	5-25	RT	12	279-432	**
Thompson	5-25	RT	5	254-279	**
Otter	5-24	RT	9	127-406	**
		DV	3	127-229	178
	10-16	RT	13	356-584	**
		DV	3	102-229	168

* GR = grayling
SS = coho salmon
DV = Dolly Varden
RT = rainbow trout

** Not available

Upper Cook Inlet-Anchorage-West Side Susitna River Chinook Salmon Escapement:

The 1977 escapement of chinook salmon, Oncorhynchus tshawytscha (Walbaum), into upper Cook Inlet streams was substantially higher than 1976 levels. A total of 77,303 salmon were observed during 1977. This amounts to a 49% increase over the 39,435 chinook salmon enumerated during 1976, Table 3.

For the fifth successive year, chinook salmon surveys of sufficient magnitude to estimate total spawning escapements were conducted on all major clearwater tributaries of the western Susitna River. A minimum estimate of the total spawning population was 101,592 chinook salmon. The 1977 escapement level was approximately double the previous high of 51,300 estimated for 1976.

Indications are the 1977 chinook salmon escapement into the Deshka River and Lake and Alexander creeks, is one of the highest recorded. A summary of chinook salmon counts of record high and lows for some of the Anchorage-Susitna streams is presented in Table 4.

The 1977 escapement appears to have a high reproduction potential. Carcass data collected on the Deshka River and Alexander Creek reveal a high percentage of five-and six-year-old spawning females.

A sample of 416 chinook salmon carcasses from the Deshka River were examined for sex and length composition. The salmon ranged in length from 297 to 1,257 mm, with a mean of 897 mm. Males averaged 859 mm and females 952 mm. Sex ratio of males to females was 1:1.2. The 1977 carcass sample was composed predominately of five-year-old fish (1.3) ranging in length from 660 to 965 mm. Age composition determined by length frequencies indicated 50.5% were five years old; 36.8% were six years old; 9.1% were four years old; and 3.6% were three-year-old fish (Table 5). A total of 210 chinook salmon carcasses were also sampled on Alexander Creek. The fish ranged in size from 366 to 1,131 mm, with an average of 877 mm. Males averaged 838 mm and females 928 mm. Sex ratio of male to females was 1.1:1. Age composition indicated 73.3% were five years old; 16.7% were six years old; 8.6% were four years old; and 1.4% were three-year-old fish (Table 6).

In addition to the west side Susitna River streams, Eagle River tributaries, Ship, Bird and Campbell creeks, located in the Anchorage area, were surveyed for spawning populations of chinook salmon (Table 3).

Eulachon Investigations:

A creel census program designed primarily for determination of total recreational harvest and effort was conducted for the eulachon, Thaleichthys pacificus (Richardson), dip net sport fishery at Twenty Mile River. The main channel of Twenty Mile was ice-free by April 5, 1977. First reports of eulachon in the river occurred April 21, with the peak of the smelt dip net fishery occurring during the last week in May. The run spanned a period of 44 days from April 23 to June 5, 1977.

Table 3. Chinook Salmon Counts - Upper Cook Inlet 1976-1977.

Streams	1977	1976
Deshka River	39,642	21,693
Alexander Creek	13,385	5,412
Chuit River	1,891	1,984
Theodore River	2,263	1,032
Lewis River	454	380
Talachulitna River	1,856	1,319
Lake Creek	7,391	3,735
Martin Creek	1,060	791
Cache Creek	100	61
Bear Creek	298	15
Olson Creek	1,229	247
Pretty Creek	36	---
Bishop Creek	468	12
Nikolai Creek	143	11
Straight Creek	24	59
Red Creek	1,511	---
Peters Creek	3,042	1,489
Donkey Creek	159	---
Fish Creek (Quiks)	131	---
Fish Creek (Kroto S)	132	---
Unnamed-Kichatna River	120	---
Clearwater Creek	47	---
Quartz Creek	8	---
Canyon Creek	135	44
Dickason Creek	4	---
Unnamed Hays River	2	---
Rabideux Creek	99	---
Ship Creek (Anchorage)	1,011	806
S.F. Eagle River (Anchorage	313	81
N.F. Eagle River (Anchorage)	---	20
Bird Creek (Anchorage)	---	6
Drill Creek	---	11
Campbell Creek (Anchorage)	349	210
Coal Creek	---	17
Total Count	77,303	39,435
Estimated Total Count	101,592	51,300

Table 4. Comparative Chinook Salmon Escapement Counts, West Side Susitna River and Anchorage Area Streams.

Stream	1977 Escapement	Record High		Previous High		Record Low	
Deshka River	39,642	39,642	(1977)	21,693	(1976)	933	(1966)
Alexander Creek	13,385	13,385	(1977)	5,412	(1976)	202	(1972)
Lake Creek	7,391	7,391	(1977)	3,375	(1976)	147	(1966)
Ship Creek	1,011	1,746	(1970)			94	(1964)
Chuitt River	1,891*	1,984	(1976)			13	(1969)
Theodore River	2,263	2,263	(1977)	1,032	(1976)	8	(1964)
Lewis River	454	454	(1977)	205	(1973)	7	(1972)
Campbell Creek	349	349	(1977)	300	(1967)	15	(1966)
S.F. Eagle River	313	313	(1977)	159	(1965)	28	(1968)
Peters Creek	3,042	3,042	(1977)	1,489	(1976)	8	(1975)

* Incomplete count

Table 5. Age and Length Data From Chinook Salmon Carcasses, Deshka River, 1977.

Age Class	No. this age in sample	% this age of total sample	Male Length (mm)		Female Length (mm)		Sex Ratio
			No. in sample	Range	No. in sample	Range	Male-Female
III	15	3.6	15	297- 508			All male
IV	38	9.1	38	508- 660			All male
V	210	50.5	70	660- 965	140	754- 965	1:2
VI	153	36.8	77	965-1,257	76	965-1,154	1:1
Total	416	100.0	200	297-1,257	216	754-1,154	1:1.2

Table 6. Age and Length Data from Chinook Salmon Carcasses, Alexander Creek, 1977.

Age Class	No. this age in sample	% this age of total sample	Male Length (mm) No. in sample	Male Length (mm) Range	Female Length (mm) No. in sample	Female Length (mm) Range	Sex Ratio Male-Female
III	3	1.4	3	366- 508			All male
IV	18	8.6	18	508- 660			All male
V	154	73.3	76	660- 965	78	754- 965	1:1
VI	35	16.7	12	965-1,131	23	965-1,109	1:1.9
Total	210	100.0	109	366-1,131	101	754-1,109	1.1:1

In 1977, recreational anglers fished an estimated 6,791 man-hours to harvest 170,349 fish. This was substantially higher than the previous year's catch of 54,061 eulachon. The mean success rate of anglers was 25.1 fish per hour in 1977 compared to 13.0 fish per hour in 1976.

Mean length and weight of smelt in the 1977 population, as collected from 408 fish samples between April 29 and June 5, was 227 mm and 65.89 gm. Smelt in Twenty Mile River during 1977 had a sex ratio of 7.4:1 males per females.

The mean length (mm), weight (gm), and sex ratio of smelt in the 1977 samples are shown by sex and date of collection in Table 7.

Deshka River Coho Creel Census:

A creel census program to evaluate current fishing levels, angler hours, and the total coho, Oncorhynchus kisutch (Walbaum), harvest for the Deshka River was conducted in 1977.

In 1977, recreational anglers fished an estimated 10,904 man-hours to harvest 527 coho salmon. The mean success rate of anglers was 0.05 fish per hour. When compared to catch rates of 0.34+ fish per hour during the 1960's, the present fishery can only be characterized as unsatisfactory. These low catch rates would have to be attributed to low coho stock levels.

Harvest and effort estimates for 1977 by weekly sampling period from July 2 through August 31 are presented in Table 8.

Mean length and weight of coho, as collected from 117 fish samples, was 522 mm (20.5") and 2.5 kg each (5.5 lbs.), respectively. Sex ratio of males to females was 1.2:1.

The overall magtitude of the coho run into the Deshka River is unknown. Attempts have been made to quantify escapements, but results have been generally incomplete due to the relatively small numbers of fish and poor survey conditions during the fall.

Eshamy-Western Prince William Sound:

Creel census activities conducted at Eshamy Creek (Lagoon) in 1977 revealed a total recreational harvest of 114 sockeye salmon, O. nerka (Walbaum), (Table 9) in 233 man-days of fishing effort. Catch per angler-day decreased from 1.14 in 1976 to 0.49 sockeyes in 1977 (Table 10). Although the 1977 sockeye escapement was lower than the previous year's run, the decrease in recreational effort and harvest can be attributed to inclement weather conditions that seemed to prevail throughout the summer months, thus reducing boat and float plane access to the area.

Cutthroat trout, Salmo clarki Richardson, and Dolly Varden, Salvelinus malma (Walbaum), are also present in the Eshamy system, but generally receive little fishing effort; most catches are made incidentally to salmon fishing. During 1977, 44 cutthroat trout and 11 Dolly Varden were creel checked.

Table 7. Mean Weight, Length and Sex of Eulachon from Twenty Mile River by Day, 1977.

Date	Length Range (mm)		Mean Total Length (mm)		Weight Range (gm)		Mean Weight (gm)		Sex Ratio
	Male	Female	Male	Female	Male	Female	Male	Female	Male/Female
4/29	No Males	220-222	No Males	221.33	No Males	90.71-99.79	No Males	99.79	All Females
4/30	220-235	None	227.5	None	81.6-86.1	None	83.85	None	All Males
5/01	210-240	220	223.5	220	54.4-99.8	90.7	86.2	90.7	19:1
5/02	209-251	216-255	225.21	235.88	54.4-99.8	81.6-108.9	86.2	95.3	3.16:1
5/06	209-270	205-209	216.11	207.0	81.6-127	72.6-86.2	99.8	81.6	9:1
5/07	204-251	221-238	228.6	231.3	77.1-117.9	86.2-113.4	90.7	104.3	5.6:1
5/08	210-262	225-246	229.1	236.25	81.6-117.9	86.2-127	95.3	104.3	4:1
5/09	209-236	205-234	219.53	222.33	54.4-99.8	81.6-99.8	86.2	90.7	5.6:1
5/11	195-232	219-232	221.62	226.20	81.6-104.3	95.3-108.8	90.7	99.8	2.6:1
5/14	162-232	240	191.47	240	45.4-99.8	99.8	77.11	98.8	19:1
5/15	214-242	209-230	225.41	219	63.5-108.9	81.6-86.2	81.6	81.6	5.6:1
5/17	191-249	222	224.89	222	63.5-95.3	72.6	81.6	72.6	19:1
5/19	196-242	205-222	222.3	210	63.5-108.9	72.6-90.7	86.2	81.6	5.6:1
5/21	192-240	222	223.79	222	54.4-108.9	90.7	95.3	90.7	19:1
5/22	196-239	203-225	226.07	212.5	68.0-108.9	54.4-90.7	86.2	72.6	2.3:1
5/24	216-240	209-230	229.79	219.5	72.6-99.8	72.6-86.2	90.7	81.6	9:1
5/27	No fish caught								
5/28	195-246	220-240	224.06	231.0	45.4-108.7	72.6-99.8	81.6	86.2	5.6:1
5/29	209-242	All Males	228.6	All Males	54.4-99.8	All Males	81.6	All Males	All Males
5/30	210-245	All Males	228.5	All Males	63.5-117.9	All Males	90.7	All Males	All Males
6/01	222-258	217	239.79	217	63.5-104.3	63.5	86.2	63.5	19:1
6/04	199-242	202-216	222.8	206.67	No data		No data		5.6:1
6/05	193-240	196	227.42	196	63.5-99.8	81.6	90.7	81.6	19:1
Season Total	162-270	202-255	227.8	222.9	45.4-127	54.4-127	90.7	86.2	7.4:1

Table 8. Deshka River Coho Salmon Harvest and Effort Estimates, 1977.

Week	Angler/ Hours	Angler/ Days	Coho Harvest	Hours Angler/Day	Catch Hour
7/ 2-7/ 8	1,105	162	0	6.82	0
7/ 9-7/15	961	164	0	5.86	0
7/16-7/22	962	205	15	4.69	0.02
7/23-7/29	3,007	344	170	8.74	0.06
7/30-8/ 5	1,547	282	88	5.49	0.06
8/ 6-8/12	1,364	273	162	5.00	0.12
8/13-8/19	837	190	53	4.41	0.06
8/20-8/26	880	150	29	5.87	0.03
8/27-8/31	241	29	10	8.31	0.04
Total	10,904	1,799	527	6.06	0.05

Table 9. Eshamy Lagoon Salmon Catch, 1967-1977.

Year	Census Period	Sport Harvest				Total Salmon	Sockeye Escapement	Sockeye Commercial Catch**
		Sockeye	Pink	Coho	Chum			
1966	7/01-9/05	151	42	6		199	26,593	20,876
1968	6/30-8/27	316	5	8		329	68,048	Closed
1969	6/26-9/11	452	40	9	1	502	60,196	61,728
1970	6/25-9/01	448	49	1		498	11,460	17,292
1971	7/12-9/05	297	29	23		349	3,000	Closed
1972	7/01-9/10	1,413	141	60		1,614	28,750	52,888
1973	6/29-9/10	2,698	182	0		2,880	10,202	16,439
1974	6/23-8/27	1,472	364	0		1,836	637*	19,037
1975	6/21-9/19	53	139	14		206	1,754	Closed
1976	6/25-9/11	759	140	24		923	19,360	Closed
1977	6/12-9/12	114	110	17		241	11,746	26,546

* Escapement count incomplete, weir panels pulled early.
** Eshamy District

Table 10. Eshamy Lagoon Sport Effort (Anger-Days) and Catch/Angler, 1972-1977.

Year	Angler/ Days	Catch/Angler/Day			All Salmon
		Sockeye	Pink	Coho	
1972	380	3.71	0.37	0.16	4.24
1973	949	2.84	0.19		3.03
1974	771	1.91	0.47		2.38
1975	302	0.17	0.46	0.05	0.68
1976	666	1.14	0.21	0.03	1.38
1977	233	0.49	0.47	0.07	1.03

Rearing Coho and Chinook Salmon Studies

Rabideux and Montana creeks, in the Talkeetna area, were selected for the coho and chinook study due to: (1) ease of access, (2) opposite physical characteristics, i.e., Rabideux is a slow meandering system while Montana has a steep gradient and rapid current, and (3) the difference in rearing species composition.

Rabideux Creek:

Rabideux Creek was primarily chosen to obtain data on coho salmon fry densities and yearling movements. Other species inhabiting the system were found to be chinook salmon; round whitefish, Prosopium cylindraceum (Pallas); longnose sucker, Catostomus catostomus (Forster); arctic grayling, Thymallus arcticus (Pallas); pink salmon, O. gorbuscha (Walbaum); Dolly Varden char; rainbow trout, Salmo gairdneri Richardson; threespine stickleback, Gasterosteus aculeatus (Linnaeus); burbot, Lota lota (Linnaeus); slimy sculpin, Cottus cognatus (Richardson); and the western brook lamprey, Lampetra richardsoni Vladykov and Follett.

Intensive fry trapping was undertaken in Rabideux Creek on June 16. The creek was sectioned into three study areas: Upper, middle, and lower. From June 16 through August 31, all yearling cohos captured were given a distinctive fin clip to identify the area of capture. Trapping was continued until mid-November, at which time extreme cold weather and resulting ice cover prevented further work. All catches of rearing coho and chinook captures and recaptures were recorded and are presented in Table 11. In all, a total of 1,041 yearling cohos were marked. Of these, 274 were marked in the upper sub-area, 753 in the middle sub-area, and 14 in the lower sub-area. Recaptures of these marked fish were 159 in the original area of marking and 32 in dispersed areas. Fourteen marked yearlings moved downstream, five upstream, and 13 migrated to small lateral tributaries. As no distinct pattern was exhibited, this movement is attributed to random scattering. However, upstream movements of juvenile salmonids into lateral tributaries to overwinter has been previously described by Elliott (1975), Skeesick (1970), and Bustard and Norver (1975). It has been theorized this movement to tributaries may be related to more stabilized water temperatures found in these systems throughout the winter.

Also to be noted is the increase in catch per hour of coho fry following August 1. This is attributed to their size increase which made them more susceptible to capture in the 1/4" (6.35 mm) mesh minnow traps.

The flow of Rabideux Creek was found to range from a low of 24.3 cfs on August 23 to a high of 400.7 cfs on September 29. The average seasonal flow was found to be 132.7 cfs. Water quality tests conducted throughout the season revealed the following ranges: pH 6.6-7.7; dissolved oxygen 6-12 milligrams per liter; alkalinity 17-68 milligrams per liter; total hardness 17-68 milligrams per liter. As would be expected, higher D.O. values were obtained during cooler periods while higher alkalinity and hardness were exhibited during warmer periods. The pH values did not appear to be temperature dependent.

Table 11. Rabideux Creek, Coho Salmon Fry Trapping, 1977.

Period	Smolt	Yearling	Recovered Marked Yearling	Fry	Trap Hours	Yearling Per Hour	Fry Per Hour
6/16- 6/30	113	583*	17	173	7,800	.08	.02
7/ 1- 7/15	0	289*	38	381	5,616	.06	.07
7/16- 7/31	0	0*	0	0	0	0	0
8/ 1- 8/15	0	44*	2** 18	727	3,696	.02	.20
8/16- 8/31	0	125*	2** 64	3,764	4,968	.04	.76
9/ 1- 9/15	0	31	1	180	480	.07	.38
9/16- 9/30	0	80	3** 1	248	1,464	.06	.17
10/ 1-10/15	0	511	5** 7	2,026	7,128	.07	.28
10/16-10/31	0	387	7** 6	1,502	2,279	.18	.66
11/ 1-11/15	0	629	13** 7	2,960	3,346	.19	.88

* Marking of coho yearlings was terminated on 8/31. A total of 1,041 yearlings were marked with distinctive fin clips in three study sections.

** These marked yearlings exhibited a random movement from area of release, 14 downstream, 5 upstream, and 13 into lateral tributaries.

Table 11. (Cont). Rabideux Creek, Chinook Salmon Fry Trapping, 1977.

Period	Smolt	Fry	Trap Hours	Fry Catch Per Hour
6/16- 6/30	24	1,908	7,800	.24
7/ 1- 7/15	0	1,945	5,616	.35
7/16- 7/31	0	0	0	0
8/ 1- 8/15	0	298	3,696	.08
8/16- 8/31	0	1,456	4,968	.29
9/ 1- 9/15	0	797	480	1.66
9/16- 9/30	0	516	1,464	.35
10/ 1-10/15	0	5,161	7,128	.72
10/16-10/31	0	1,071	2,279	.47
11/ 1-11/15	0	1,919	3,346	.57

Water temperatures, collected through the use of Ryan 30 day recording thermographs, are presented by monthly periods in Table 12. The high temperatures shown for July (16°C- 18.8°C) lasted for a six-day period. These highs dropped to 15°C during the late evening and early morning hours.

In general, Rabideux Creek was found to support sizeable populations of coho and chinook salmon fry throughout the season. No distinct movement of these rearing fish could be detected with the possible exception of a minor late fall migration into lateral tributaries. Physical and chemical properties were found to be within excepted limits for salmonids. Adult escapements could not be determined due to the turbid water coloration and depth of holding pools.

Montana Creek:

Montana Creek was also sectioned into three study sub-areas: upper, middle, and lower. The upper area was approximately eight stream miles above its mouth; the middle, three stream miles; and the lower was from the Parks Highway downstream to its junction with the Susitna River. Fish species inhabiting Montana Creek were identical to those in Rabideux Creek. The upper and middle sections were seined from July 19 through August 4. All chinook fry captured during this period were marked with an upper caudal fin clip for the upper area and a lower caudal fin clip for the middle area. In all, a total of 25,176 fry were marked--16,039 in the upper area, and 9,137 in the middle area.

Minnow traps baited with salmon roe were utilized from the latter part of August until the end of February to monitor fry movements and population densities through the system. Table 13 will illustrate the findings of this trapping in bi-weekly periods until the first of December. After this time, trapping was conducted one to three days per month.

The chinook catch per hour (Table 13) best indicates a gradual population density decline until February, when a drastic reduction was recorded. The gradual reduction is attributed to fry slowly moving downstream to the Susitna River during the season. This is also evidenced by marked fry being recovered below their area of release while no evidence of upstream recoveries was recorded.

The drastic reduction in population density found in February is attributed to the extremely low water condition encountered at that time. It was believed that the reduced flow eliminated required rearing habitat and forced the rearing salmonids into the mainstem of the Susitna River. To test this theory, traps were set in the river and one of the sloughs. Chinook fry were recovered from the main river at a rate of 0.45 per hour. In the slough they were recovered at a rate of 0.12 per hour. Though these catch rates are low, they proved the existence of rearing chinook utilizing the mainstem Susitna River at that time.

Water temperatures on a monthly basis are presented in Table 14. The temperatures shown were recorded in the upper study area. When water temperatures dropped to 0°C, anchor, frazil, and surface ice formed throughout the system and frequent ice dams were formed.

Table 12. Monthly Water Temperatures, Rabideux Creek, 1977.

Month	Upper Section		Lower Section	
	Low °C	High °C	Low °C	High °C
May	8.2	11.7	8.3	12.2
June	10.0	15.5	10.2	16.0
July	13.0	18.8	12.3	18.3
August	11.0	16.0	8.7	15.0
September	5.5	11.0	3.0	10.7
October	1.7	5.7	0.0	4.6

Table 13. Montana Creek Salmon Fry Trapping, 1977.

Period	Chinook Unmarked Fry	Chinook Upper Marked Fry	Chinook Middle Marked Fry	Coho Fry	Coho Yearling	Trap Hours	Chinook Per Hour	Coho Per Hour
UPPER SECTION								
8/15- 8/31	178	56	0	0	0	312	.75	0
9/ 1- 9/15	336	6	0	1	5	115	2.97	.05
9/16- 9/30	461	2	0	11	0	294	1.57	.04
10/ 1-10/15	4,188	7	0	0	14	2,540	1.65	.01
10/16-10/31	2,987	16	0	6	5	1,560	1.93	.01
11/ 1-11/15	1,467	3	0	2	8	888	1.66	.01
11/16-11/30	410	1	0	0	2	402	1.02	.01
-12/22	136	0	0	2	0	128	1.06	.02
- 1/27	185	0	0	4	0	126	1.47	.03
2/23- 2/24	126	0	0	1	0	440	0.29	.00
MIDDLE SECTION								
8/15- 8/31	1,206	6	13	0	0	360	3.40	0
9/ 1- 9/15	1,445	6	8	19	1	328	4.45	.06
9/16- 9/30	0	0	0	0	0	0	0	0
10/ 1-10/15	1,982	4	4	0	10	936	2.13	.01
10/16-10/31	3,218	5	10	24	13	1,490	2.17	.02
11/ 1-11/15	1,601	3	5	22	3	1,208	1.33	.02
11/16-11/30	507	3	1	3	3	390	1.31	.02
-12/22	187	0	0	0	3	120	1.56	.03
- 1/27	40	0	0	1	0	130	0.31	.01
2/23-24	32	0	0	0	1	406	.08	.00
LOWER SECTION								
8/15- 8/ 3	1,627	6	9	0	0	576	2.85	0
9/1- 9/15	2,077	0	2	56	0	142	14.64	.39
9/16- 9/30	891	1	3	7	39	423	2.12	.11
10/ 1-10/15	5,002	4	1	100	162	3,292	1.52	.08
10/16-10/31	2,221	6	1	75	21	1,236	1.80	.08
11/ 1-11/15	647	1	0	3	0	936	.69	.00
11/16-11/30	456	0	0	1	3	228	2.00	.02
12/21-12/23	174	1	0	0	4	288	.61	.01
- 1/27	116	0	0	3	0	108	1.07	.03
2/23- 2/24	108	0	0	0	1	372	.29	.00

Table 14. Monthly Water Temperatures, Montana Creek, 1977.

Month	Low °C	High °C
May	2.8	5.8
June	4.0	11.0
July	10.0	15.0
August	9.8	14.0
September	7.7	11.9
October	0.0	4.5

Water quality tests were conducted on a biweekly schedule from June through October. These tests revealed the following ranges: pH 6.8-7.7; dissolved oxygen 8-13 milligrams per liter; alkalinity and total hardness 17-34 milligrams per liter. Readings were found to be relatively stable in Montana Creek when compared to the fluctuations exhibited by Rabideux Creek.

DISCUSSION

A statistically selected sample of anglers was interviewed and counted to determine harvest and effort for eulachon from Twenty Mile River. This year an estimated 170,000 eulachon were harvested, providing approximately 6,800 angler days of fishing.

Chinook salmon counts in upper Cook Inlet revealed a very large escapement. A total of 77,303 chinook salmon were observed in 30 local (Anchorage) and west side Susitna streams during 1977, providing a total escapement estimate of 101,592.

A total of 17 lakes and one stream in the immediate Anchorage, Fort Richardson, and Elmendorf A.F.B. vicinity, were stocked with game fish in 1977. In recent years, stocking programs in this area have relied heavily on plants of catchable size rainbow trout.

The 1977 sport fish harvest on the Deshka River was considered poor as a result of low coho stock levels.

Trapping of fry and yearling coho salmon in Rabideux Creek failed to reveal any specific directional movement of these fish throughout the season. A movement of both fry and yearling cohos was noted into lateral tributaries during October, which coincided with the onset of colder water temperatures. It was also found that coho salmon fry do not obtain a trappable size until August. Chinook salmon fry densities in Rabideux Creek were found to remain fairly constant thorughout the field season.

Marked chinook fry in Montana Creek exhibited no upstream movement. However, they did appear to exhibit a gradual downstream movement through the late summer, fall, and early winter. Population density of these fry were also found to slowly decline through the season until February, when a drastic reduction was recorded. This reduction was associated with extreme low water conditions. Also, in February, chinook fry were found inhabiting the main Susitna River and its sloughs.

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